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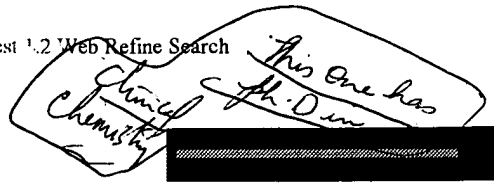

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Term	Documents
GLASS	886605
GLASSES	36935
BICERAMIC	5
BICERAMICS	0
PARTICLES	650655
PARTICLE	483081
PARTICULATE	151417
PARTICULATES	30159
3 AND ((BICERAMIC OR GLASS) ADJ5 (PARTICULATE OR PARTICLES))	3

Database: All Databases (USPT + EPAB + JPAB + DWPI + TDBD)

Refine Search:

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l3 and (glass or biceramic) adj5
(particles or particulate)
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Search History

DB Name	Query	Hit Count	Set Name
ALL	l3 and (glass or biceramic) adj5 (particles or particulate)	3	L9
ALL	l3 and (bioceramic or bioglass or glass) adj5 partic$	3	L8
ALL	l3 and polymer adj5 fibril$	0	L7
ALL	l3 and resor$ same polymer adj5 fibril$	0	L6
ALL	l3 and resor$ same polymer same reinforc$	4	L5
ALL	l1 and resor$ same polymer same reinforc$	0	L4
ALL	implant adj3 biodegrad$	243	L3
JPAB,EPAB,DWPI	l1 and resor$ adj3 polymer adj5 reinforc$	0	L2
JPAB,EPAB,DWPI	implant adj3 biodegrad$	69	L1

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=> s bone implant

L1        2629 BONE IMPLANT

=> s l1 and polylactide and (glass or ceramic or hydroxyapatite)

L2           2 L1 AND POLYLACTIDE AND (GLASS OR CERAMIC OR HYDROXYAPATITE
               )

=> s l1 and reinforc? (3a) polymer

L3           5 L1 AND REINFORC? (3A) POLYMER

=> d l3 ti tot


L3   ANSWER 1 OF 5  CAPLUS  COPYRIGHT 1998 ACS
TI   Preliminary biocompatibility screening of several biodegradable
     phosphate fiber reinforced polymers

L3   ANSWER 2 OF 5  CAPLUS  COPYRIGHT 1998 ACS
TI   A completely degradable phosphate glass/polyhydroxybutyrate (PHB)
     based composite with long term stability and biocompatibility

L3   ANSWER 3 OF 5  CAPLUS  COPYRIGHT 1998 ACS
TI   Reinforced triazine resin for joint implants

L3   ANSWER 4 OF 5  CAPLUS  COPYRIGHT 1998 ACS
TI   Absorbable, reinforced, composite, polymeric bone
     implants and implant components

L3   ANSWER 5 OF 5  CAPLUS  COPYRIGHT 1998 ACS
TI   Material for making bone endoprosthesis and endoprosthesis of said
     material

=> d ibib abs 1-5


L3   ANSWER 1 OF 5  CAPLUS  COPYRIGHT 1998 ACS
ACCESSION NUMBER:        1995:222461  CAPLUS
DOCUMENT NUMBER:         122:38659
TITLE:                   Preliminary biocompatibility screening of
                         several biodegradable phosphate fiber
                       reinforced polymers
AUTHOR(S):               Andriano, Kirk P.; Daniels, A. U.; Smutz, W.
                         Paul; Wyatt, Ronald W. B.; Heller, Jorge
CORPORATE SOURCE:        School of Medicine, University of Utah, Salt
                         Lake City, UT, USA
SOURCE:                  J. Appl. Biomater. (1993), 4(1), 1-12
                         CODEN: JABIEW; ISSN: 1045-4861
DOCUMENT TYPE:           Journal
LANGUAGE:                English
AB   This article describes preliminary biocompatibility screening of
     three degradable phosphate fibers contg. K+, Ca+2/Na+ and
     Na+/Ca+2/Al+3 ions in the polymer chain, and of several different
     degradable polymers reinforced with these
     fibers.  Biodegradable phosphate fibers of calcium-sodium-
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metaphosphate (CSM) and sodium-calcium-aluminum-polyphosphate (NCAP) were acutely nontoxic in cellular, tissue, and whole animal evaluations, as detd. by std. acute toxicity tests. Histol. studies of **bone implants** sites fabricated from composites of copolymers of poly(E-caprolactone/L-lactide) and poly(ortho ester) reinforced with either CSM or NCAP fibers showed these composite materials to be nontoxic, with no abnormal inflammatory response. However, histol. evaluation of muscle implants sites revealed the appearance of necrotic foci assocd. with implant sites in 12 of 22 NCAP contg. composite specimens ($p < 0.05$). Results of this preliminary biocompatibility screening suggest CSM fibers may be useful in **reinforcing** degradable **polymers** for prodn. of completely biodegradable composites for implant use.

L3 ANSWER 2 OF 5 CAPLUS COPYRIGHT 1998 ACS
ACCESSION NUMBER: 1993:434271 CAPLUS
DOCUMENT NUMBER: 119:34271
TITLE: A completely degradable phosphate glass/polyhydroxybutyrate (PHB) based composite with long term stability and biocompatibility
AUTHOR(S): Knowles, Jonathan C.; Hastings, Garth W.
CORPORATE SOURCE: Queen Mary Westfield Coll., IRC Biomed. Mater., London, E1 4NS, UK
SOURCE: Adv. Biomater. (1992), 10(Biomaterial-Tissue Interfaces), 439-46
CODEN: ABIODQ; ISSN: 0272-3840
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A composite has been developed, using a completely degradable phosphate glass for **reinforcement** and a PHB **polymer** matrix. Alteration of the glass compn. produces an alteration in the glass soly. In vivo, this has been used to control the overall degrdn. pattern of the composite. A close link between mass loss and the change in Young's modulus was shown. Of particular interest for this composite were the piezoelec. properties. A relationship between applied load and strain generated potential (SGP) was shown. A further relationship for loading frequency and SGP was found. Of importance for the composites SGP was the fact that the SGP was of the same order of magnitude as that found in bone, thus making this material interesting for use in orthopedics. A comprehensive in vivo study both s.c. and for femoral implants, revealed tissue reactions which were closely linked to the mass loss shown in vitro. For the **bone implants**, bone growth onto the surface of the implant was seen with little interposed soft tissue at 8 wk and direct bone growth at 12 wk.

L3 ANSWER 3 OF 5 CAPLUS COPYRIGHT 1998 ACS
ACCESSION NUMBER: 1991:520126 CAPLUS
DOCUMENT NUMBER: 115:120126
TITLE: Reinforced triazine resin for joint implants
INVENTOR(S): Gohl, Walter; Esper, Friedrich J.
PATENT ASSIGNEE(S): Bosch, Robert, G.m.b.H., Fed. Rep. Ger.
SOURCE: Ger. Offen., 5 pp.
CODEN: GWXXBX

NUMBER DATE

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PATENT INFORMATION:	DE 3942769 A1	19910627
APPLICATION INFORMATION:	DE 89-3942769	19891223
DOCUMENT TYPE:	Patent	
LANGUAGE:	German	

AB Implants, esp. joint and hip prostheses, are made of Al2O3-contg. C fiber-reinforced triazine resin. An implant material was made of triazine resin 34.3, C fiber 20.0 and Al2O3 7.2 g. As shown by the ring-on-disk test, Al2O3 strongly increased the wear resistance of the material.

L3 ANSWER 4 OF 5 CAPLUS COPYRIGHT 1998 ACS

ACCESSION NUMBER:	1989:44982 CAPLUS	
DOCUMENT NUMBER:	110:44982	
TITLE:	Absorbable, reinforced, composite, polymeric **bone implants** and implant components	
INVENTOR(S):	Tormala, Pertti; Rokkanen, Pentti; Laiho, Juha; Tamminmaki, Markku; Vainionpaa, Seppo	
PATENT ASSIGNEE(S):	Materials Consultants Oy, Finland	
SOURCE:	Finn., 14 pp. CODEN: FIXXAP	

	NUMBER	DATE
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PATENT INFORMATION:	FI 75493 B	19880331
APPLICATION INFORMATION:	FI 85-1828	19850508
DOCUMENT TYPE:	Patent	
LANGUAGE:	Finnish	

AB The title **bone implants** have a self-reinforcing structure, i.e., they consist of a matrix of an absorbing polymer or copolymer and contain absorbing fibers of comparable chem. structure as reinforcement. The structures are prepd. by mixing the fibers into the molten polymer, and cooling rapidly to avoid melting of the fibers. A molten glycolide-lactide copolymer, at 195.degree., was combined with a continuous filament material, and molded to give cylindrical pieces contg. 30% fiber, and having 45 mm diam. The tensile strength was 260 vs. 50 MPa for nonself-strengthening material.

L3 ANSWER 5 OF 5 CAPLUS COPYRIGHT 1998 ACS

ACCESSION NUMBER:	1980:28610 CAPLUS	
DOCUMENT NUMBER:	92:28610	
TITLE:	Material for making bone endoprosthesis and endoprosthesis of said material	
INVENTOR(S):	Kalnberz, V. K.; Yanson, K. A.; Knets, I. V.; Saulgozis, J. Z.	
PATENT ASSIGNEE(S):	Scientific-Research Institute of Traumatology and Orthopedics, Rizhsky, USSR; Institute of Polymer Mechanics, Academy of Sciences, Latvian S.S.R.	
SOURCE:	Brit., 12 pp. CODEN: BRXXAA	

	NUMBER	DATE
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PATENT INFORMATION:	GB 1549328	19790725
APPLICATION INFORMATION:	GB 76-38431	19760916

DOCUMENT TYPE: Patent
LANGUAGE: English
AB A material for bone endoprostheses with improved biocompatibility and durability comprises a plastic material, e.g. epoxy resin or graphite-filled polyethylene [9002-88-4], reinforced by 2 networks of metal wires and synthetic fibers, resp., to form a composite of elasticity approximating that of natural bone. The elements of each net form parallelogram-shaped meshes contg. an acute angle of 60.degree. and the metal and synthetic fiber networks are aligned or mutually offset by <10.degree.. The vol. ratio between the metal, synthetic fiber, and plastic is .apprxeq. 1:2:1.

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FILE 'CAPLUS, MEDLINE, BIOSIS, EMBASE' ENTERED AT 13:02:33 ON 30 NOV 1998
L1 2629 S BONE IMPLANT
L2 2 S L1 AND POLYLACTIDE AND (GLASS OR CERAMIC OR HYDROXYAPAT
L3 5 S L1 AND REINFORC? (3A) POLYMER

=> d ti tot l2

L2 ANSWER 1 OF 2 CAPLUS COPYRIGHT 1998 ACS
TI Biologically resorbable polymerization products made of binding agent systems which can be hardened by radiation

L2 ANSWER 2 OF 2 CAPLUS COPYRIGHT 1998 ACS
TI Calcium phosphate **ceramic**-based implant material

=> d l2 ibib abs 1-

L2 ANSWER 1 OF 2 CAPLUS COPYRIGHT 1998 ACS
ACCESSION NUMBER: 1998:338099 CAPLUS
DOCUMENT NUMBER: 129:19731
TITLE: Biologically resorbable polymerization products made of binding agent systems which can be hardened by radiation
INVENTOR(S): Wenz, Robert; Nies, Berthold
PATENT ASSIGNEE(S): Merck Patent G.m.b.H., Germany; Wenz, Robert; Nies, Berthold
SOURCE: PCT Int. Appl., 21 pp.
CODEN: PIXXD2

	NUMBER	DATE
PATENT INFORMATION:	WO 9820839 A1	19980522
DESIGNATED STATES:	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM	

	RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG
APPLICATION INFORMATION:	WO 97-EP6029 19971031
PRIORITY APPLN. INFO.:	DE 96-19646782 19961113
DOCUMENT TYPE:	Patent
LANGUAGE:	German

AB Ethylene glycol and glycerol esters of .omega.-(meth)acryloyloxy-terminated poly(.omega.-hydroxy acids) HO2CR1OH [R1 = CH2, CHMe, CH2CH2, (CH2)3, CHMeCH2, CH2CHMe, or o-, m-, or p-C6H4] are polymd. with electromagnetic radiation to form bioresorbable polymers useful in prodn. of tooth varnish, tooth inlays, and molded implants. Application of a temporary, resorbable varnish contg. e.g. a Ca salt, an antibiotic, or an elastase inhibitor to an occlusive film inserted into the alveolus-root space aids in regeneration in treatment of periodontitis. The varnish may contain a local anesthetic to diminish sensitivity of exposed necks of teeth, or a fluoride to promote hardening of the tooth surface. Inlays prepd. from mixts. of the esters and hydroxylapatite do not shrink during polymn., and therefore do not form marginal clefts in cavities. Molded porous implants may be impregnated with the monomer and irradiated for use as artificial bone; degrdn. of the polymer permits ingrowth of new bone tissue. Thus, ethylene glycol oligolactide bismethacrylate was mixed with 1% camphorquinone in darkness and stored in a brown **glass** bottle. The film produced by application of this mixt. to a tooth and photopolymn. was very strong and resistant to abrasion.

L2 ANSWER 2 OF 2 CAPLUS COPYRIGHT 1998 ACS

ACCESSION NUMBER:	1993:87709 CAPLUS
DOCUMENT NUMBER:	118:87709
TITLE:	Calcium phosphate **ceramic**-based implant material
INVENTOR(S):	Bauer, Hans Joerg; Bauer, Gerd; Dingeldein, Elvira; Wahlig, Helmut
PATENT ASSIGNEE(S):	Merck Patent G.m.b.H., Germany
SOURCE:	Eur. Pat. Appl., 7 pp. CODEN: EPXXDW

	NUMBER	DATE
PATENT INFORMATION:	EP 519293 A2	19921223
DESIGNATED STATES:	R: AT, CH, DE, ES, FR, GB, IT, LI	
APPLICATION INFORMATION:	EP 92-109631	19920609
PRIORITY APPLN. INFO.:	DE 91-4120325	19910620
DOCUMENT TYPE:	Patent	
LANGUAGE:	German	

AB An implant material consists of >50% Ca phosphate **ceramic** particles and **polylactide** and/or polyglycolide, disposed as bridges between the particles, to form porous structures. The **ceramic** particles are <50% covered with the polymer. A mixt. of Spongiosa bone **ceramics** 75, poly(DL-lactide) 22, and DL-lactic acid 3 parts was molded and microwave-irradiated (450W) for 3 min, to give a **bone implant**.

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was very strong and resistant to abrasion.

L2 ANSWER 2 OF 2 CAPLUS COPYRIGHT 1998 ACS

ACCESSION NUMBER:	1993:87709 CAPLUS
DOCUMENT NUMBER:	118:87709
TITLE:	Calcium phosphate **ceramic**-based implant material
INVENTOR(S):	Bauer, Hans Joerg; Bauer, Gerd; Dingeldein, Elvira; Wahlig, Helmut
PATENT ASSIGNEE(S):	Merck Patent G.m.b.H., Germany
SOURCE:	Eur. Pat. Appl., 7 pp. CODEN: EPXXDW

	NUMBER	DATE
PATENT INFORMATION:	EP 519293 A2	19921223
DESIGNATED STATES:	R: AT, CH, DE, ES, FR, GB, IT, LI	
APPLICATION INFORMATION:	EP 92-109631	19920609
PRIORITY APPLN. INFO.:	DE 91-4120325	19910620
DOCUMENT TYPE:	Patent	
LANGUAGE:	German	

AB An implant material consists of >50% Ca phosphate **ceramic** particles and **polylactide** and/or polyglycolide, disposed as bridges between the particles, to form porous structures. The **ceramic** particles are <50% covered with the polymer. A mixt. of Spongiosa bone **ceramics** 75, poly(DL-lactide) 22, and DL-lactic acid 3 parts was molded and microwave-irradiated (450W) for 3 min, to give a **bone implant**.

=> log h

COST IN U.S. DOLLARS	SINCE FILE	TOTAL

Document Number 2

Entry 2 of 4 File: USPT Feb 20, 1996

DOCUMENT-IDENTIFIER: US 5492697 A
TITLE: Biodegradable implant for fracture nonunions

ABPL:
A biodegradable implant for placement in nonunion bone fractures as a substitute for bone graft material is provided which is a flat plate or disk having a thickness of between about 1 mm and about 15% of the length of the bone, interconnected micropores, and canals substantially equivalent in size and spacing to naturally-occurring Haversian canals. The implant may additionally comprise additives such as growth factors, including bone morphogenic protein. In a preferred embodiment the implant is formed from a biodegradable polymer such as a polylactic acid-polyglycolic acid copolymer by a gel casting technique followed by solvent extraction to precipitate the implant as a microporous solid.

BSPR:
Kulkarni et al., Arch. Surg., 93:839-43 (1966) describe the production of poly(DL-lactic acid) pins for reduction of mandibular fractures in dogs. Getter et al., J. Oral Surg., 30:344-48 (1972), describe the use of high molecular weight PLA plates to treat mandibular fractures in dogs. Leenslag et al., Biomaterials, 8:70-73 (1987), disclose treatment of fractured zygoma in 10 patients using high molecular weight PLA plates. Such polymers, however, tend to be absorbed very slowly. Bostman et al., J. Bone and Joint Surgery, 69-B, No. 4 (1987), describe the use of high strength, fast resorbing, self-reinforced PLA/PGA rods for routine treatment of patients with displaced malleolar fractures.

DEPR:
The resorption rate of biodegradable polymers may be influenced by the material form. Porosity generally facilitates fluid ingress throughout the material, exposing a large surface area of the material to chain scission by hydrolysis. Increased degradation rates can be expected. Porous implant surfaces present a favorable surface for cell attachment and growth, enhancing the implant's function as a biodegradable scaffold for tissue repair or implant fixation.

Document Number 1

Entry 4 of 4 File: USPT Apr 7, 1987

DOCUMENT-IDENTIFIER: US 4655777 A
TITLE: Method of producing biodegradable prosthesis and products therefrom

ABPL:
Method of producing biodegradable prostheses comprising a composite of resorbable fibers reinforcing a biodegradable polymer matrix and the use thereof in medical applications such as bone plates and other orthopedic devices. The fibers include ceramic powders, .beta.-TCP and CaAl and a biodegradable glass, CMP.

BSPR:
Those materials and many of the prior art materials suffer from the common drawback of being permanent. In many applications, such as a fixation appliance holding a fracture together while it heals, it is highly desirable if the implant can be resorbed by the body. Such an implant would biodegrade over a period of weeks or years, and be gradually replaced by natural bone growth. Such materials eliminate the need for a second surgery to remove the implant. However, homogenous fixation plates previously fabricated from biodegradable polymers have been shown to possess insufficient strength and rigidity for initial fracture fixation. Porous resorbable ceramics have also been used in bone repair, but they must be used in conjunction with other support because of their fragile nature.

BSPR:
The disadvantages of the prior art are overcome by the present invention comprising biodegradable, high-strength, rigid fixation systems formed of composites of biodegradable polymers reinforced with resorbable fibers, particularly calcium phosphate fibers; the degradation products of the composites of the present invention are nontoxic and harmless to the host. The preferred polymers include polyglycolide (PGA), poly(DL-lactide) (DL-PLA), poly(DL-lactide-co-glycolide) (DL-PLG), poly(L-lactide) (L-PLA), poly(L-lactide-co-glycolide) (L-PLG), polycaprolactone (PCL), polydioxanone, polyesteramides, copolyoxalates and the polycarbonates because of their degradation times and their degree of control of degradation.

DEPR:
Bone contains a matrix of calcium hydroxyapatite, a resorbable ceramic material, in callagen. The calcium hydroxyapatite provides rigidity and the same material, when incorporated into biodegradable polymers, should provide the necessary reinforcement for use as fixation plates or devices. A variety of ceramic forms of hydroxyapatite [Ca.sub.10 (PO.sub.4).sub.6 (OH).sub.2] and tricalcium phosphate [CA.sub.3 (PO.sub.4).sub.2] have been reported in the literature. Recent evidence indicates that ceramic forms of hydroxyapatite are inert as implant materials while whose of tricalcium phosphate (Whitlockite) are bioabsorbable. The strength, durability, and absorption kinetics of tricalcium phosphate ceramics depend on the phasic nature of the final product, the lattice structure of the phases present, and the porosity and total surface area. Preparation of a calcium phosphate ceramic of

high purity and single-phase nature is accomplished by the precipitation method of Salsbury and Doremus for production of .beta.-Whitlockite (.beta.-TCP), as follows:

DEPR:
With a composite formed from a biodegradable polymer and resorbable fibers, the strength decreases with resorption time within the body. This decrease in strength is important because the fixation plate transfers the load with time to the healing bone and prevents stress protection atrophy. The loss of strength of the polymer plates reinforced with biodegradable fibers will depend primarily upon the degradation rate of the polymer because the polymer completely encases the fibers. The degradation rate of the polymeric matrix depends upon the type of polymer used. It should be noted that the degradation times set forth above are for complete disappearance from the polymer. The time for strength loss in the composite will be considerably less and can be approximated as one half the total polymer degradation time. Composites which lose their strength in one month will be useful as well as those that last up to about one year. The preferred times will be three to six months. It should also be noted that the biodegradation times of the polymers and the corresponding strength losses of the composites will depend upon polymer molecular weights. The values given in the table are for normal molecular weights. Higher molecular weight polymers will last longer and those lower in molecular weight will degrade faster. The degradation rate of the polymer can be changed by control of molecular weight, by the type of biodegradable polymer, and by controlling the ratio of lactide to glycolide in co-polymers.